

REMARKS

The Examiner has rejected claims 1-3, 6, and 9-15, under 35 U.S.C. 103(a) as being unpatentable over WO 97/46740 A1 alone or in view of Hainsworth (US 4,085,997 A) and DE 297 21 741 U1. This rejection is respectfully traversed in view of the arguments below.

WO 97/46740 A1 discloses a contact element 104 with contact areas (humps) at 62 (figs. 4, 8) for supplying current to a PCB. Contrary to the present invention, the contacts in WO 97/46740 A1 are not exposed but rather are covered by a fluid-tight and electrically insulating washer member 68, which preferably comprises an axially short resiliently deformable ring 70 and a longer rigid ring 72 that axially extends beyond the core second end 66, as seen in figure 8 (Page 11, lines 25-30).

The Examiner is of the opinion that omission of the washer member 68 would be an obvious change. Such omission and its function should not serve as a basis for patentability. A use of exposed contacts would also have been taught by Hainsworth and in DE 297 21 741 U1. Applicant respectfully disagrees with the Examiner's assertions.

WO 97/46740 A1 teaches away from the present invention since it is expressly stated in this document that washer members 68 would be indispensable in order to prevent core 62 of contacts 58 from being reached and corroded by the acid solution when they are submerged therein (page 12, lines 24-28).

Therefore, WO 97/46740 A1 teaches away from the claimed invention, because those skilled in the art at the time the invention was made would not have considered omitting the washer members due to the detrimental impact such an omission would have.

Further Hainsworth and DE 297 21 741 U1 teach to the contrary of the present invention. DE 297 21 741 U1 relates to a holding device having the form of a clamp and being used for

immersion plating. This clamp is comprised of two lever arms which are made from a copper core 30 and a stainless steel coating 32. At the lower end of the two lever arms cross bars 34, 36 are attached which hold at least a pair of contact studs 38, 40 each. In the case of figure 2 each of the two lever arms comprises four contact studs 38. DE 297 14 741 U1 does not teach the use of unprotected contacts. On page 3, lines 14-24, the use of a sleeve covering the contact stud is described:

"According to a further advantageous feature of the present invention a sleeve is fixed at each of the contact studs, this sleeve being elastically deformable in a direction axial to the contact studs and which protrudes over the contact area of the contact stud in a slackened condition. If the clamp clamps a printed circuit board, the loose ends of the sleeves press against the surface of the printed circuit board making the contact between them tight and thus prevent the contact areas to come into contact with the electrolytic solution, which later would lead to undesirable metallic deposits at the contact areas. In a preferred embodiment the sleeves are made in the form of a bellows."

Further on page 5, lines 21-28 it is stated in this document:

"At each of the contact studs 38, 40 compressible sleeves 42 made in the form of bellows and of rubber or plastics are attached, wherein the sleeves protrude over the respective contact area of the contact studs by about 1 mm if the clamping device is in an opened condition and pressing against the printed circuit board making the contact between them tight if the clamping device is closed and being slightly compressed in an axial direction. As a consequence it is guaranteed that the contacts are protected from the action of the electrolyte and hence from the contacts being metallized."

Consequently contrary to the Examiner's assertion this document does not disclose that

the contacts are exposed. Hence this document does not remedy the deficiency in WO 97/46740 A1, and this document in combination with WO 97/46740 A1 does not render the claimed invention obvious.

Hainsworth discloses a clamp for electrically connecting a part to be anodized to a conductive bar having a member adapted to attach to the bar. The clamp comprises contacts which serve to electrically contact the part to be anodized. These contacts are exposed.

Hainsworth

It has to be considered, however, in this case, that the clamp is normally used for anodizing parts, i.e. to connect the part to be treated with the positive pole of an electric current source. Anodizing the part includes converting the surface material of the part into an oxidized condition. Normally aluminum parts undergo such a treatment, which involves forming an alumina conversion coating. In such circumstances detrimental metal plating of course cannot occur at the exposed contact members. Therefore exposing the contacts does not constitute a problem. Any coating of the contact can be disposed of subsequently, and protection of the contacts is not mandatory.

For this reason, in the apparatus of Hainsworth there is no need to use protected contacts, because anodizing does not necessitate protecting the contacts. Because the problems faced in Hainsworth are entirely different from those faced in electroplating, it cannot reasonably be argued that Hainsworth would motivate one of ordinary skill in the art to apply unprotected contacts to electroplating circuit boards.

Furthermore, the clamp of Hainsworth does not fulfill the requirement of the V/L/F equation and hence does not fulfill the requirements of claim 1 in this regard, since the ratio of the square of the overall length of all boundary lines to the size of all the contact areas for the contact of Hainsworth is less than 25. For the contact of Hainsworth, which is assumed to have a circular

contact area, this ratio is calculated to be:

$$L = 2\pi \cdot r \text{ and}$$

$$F = \pi \cdot r^2$$

Therefore

$$V = L^2 / F = (2\pi r)^2 / (\pi r^2) = 4\pi = 12.6$$

which is not at least 25.

Accordingly, those skilled in the art considering WO 97/46740 A1 in view of DE 197 21 741 U1 or Hainsworth at the time the present invention was made would not have been led to the solution for overcoming the problem of preventing damage on the copper surfaces due to high electric current fed to the surfaces as embodied in the present invention, because, as is the case with WO 97/46740 A1, DE 197 21 741 U1 teaches away from the present invention and Hainsworth does not present an adequate solution due to the different application for which the contact clamp of Hainsworth is used.

Accordingly, the rejection of claims 1-3, 6, and 9-15, under 35 U.S.C. 103(a) as being unpatentable over WO 97/46740 A1 alone or in view of Hainsworth (US 4,085,997 A) and DE 297 21 741 U1, is improper and should be withdrawn.

Claims 4 and 5 depend from claim 1. As demonstrated above, WO 97/46740 A1, Hainsworth (US 4,085,997 A) and DE 297 21 741 U1, alone or in combination are deficient in rendering claim 1 obvious. Haase does nothing to remedy this deficiency. Furthermore, as demonstrated above, claims 7 and 8 are based upon allowable claims. Accordingly, claims 4, 5, 7, and 8 should also be allowable.

Applicant respectfully submits that the application as amended is in condition for allowance and a notice to that effect is earnestly solicited. If in the Examiner's opinion that is not

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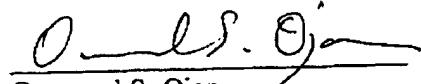
$$\frac{(4\pi R)^2}{\pi R^2} = 16\pi = 16 \times 3 = 48$$

$$\frac{(6\pi R)^2}{\pi R^2} = 36\pi = 100$$

3.1

the case, it is respectfully requested that the Examiner contact the undersigned by telephone so that any outstanding issues may be resolved as expeditiously as possible.

Respectfully submitted,



Ourmazd S. Ojan
Reg. No. 38, 065
Paul & Paul
2900 Two Thousand Market Street
Philadelphia, PA 19103
(215)568-4900

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